Ontario

Apprenticeship
In-school Curriculum Standards

Mobile Crane
and
Tower Crane Operator
Branch 1, 2 and 3

Level 1 Common Core

339A, 339B, 339C

2008-03594/

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Introduction

This new curriculum standard for the Mobile & Tower Crane Operator trade is designed from the learning outcomes, which were developed from the industry-approved training standard.

The curriculum is organized into a common core for 339A, B and C, three additional levels for Mobile Crane Operator Branch 339A and two additional levels for Tower Crane Operator 339B. Each includes reportable subjects containing learning outcomes to reflect the units of the training standard. Depending on the trade code, specific curriculum standards are to be used. Mobile Crane 339C requires the use of the Level 1 Common Core only. Mobile Crane 339A requires the use of Level 1, Common Core, and the Mobile Crane 339A curriculum combining Levels 2, 3 and 4. For Tower Crane 339B the Level 1, Common Core and the Tower Crane Level 2 and 3, combined curriculum is to be used. The hour chart indicates how the curriculum can be delivered in the current block-release format and summarizes the hours of training for each reportable by level.

The reportable subjects are cross-referenced to the training standard for ease of comparison.

Each reportable subject and learning outcome identifies a recommended number of training hours. This hour allotment is broken into hours for instruction in theory and practical application. The division of the curriculum into reportable subjects follows a natural progression of learning through the training program. This structure will allow training centres and apprentices flexibility in program delivery while still observing the importance of sequencing learning in a logical progression.

The curriculum is framed by and includes specific references to terminal performance objectives in the Apprenticeship Training Standards for the Mobile & Tower Crane Operator trade. However, the curriculum identifies only the learning that takes place off the job, in a training environment. The in-school program focuses primarily on the theoretical knowledge required to master the performance objectives of the Training Standards. Employers are expected to extend the apprentice's knowledge and skills through appropriate practical training on the work site. Regular evaluations of an apprentice's knowledge and skills are conducted throughout training to ensure that all apprentices have achieved the learning outcomes identified in the curriculum standard. The balance between theoretical and practical evaluation is identified for each unit of learning outcomes.

Implementation date:
January 1, 2008

Program Summary of Reportable Subjects

Mobile Crane and Tower Crane Operator – Branch 1, 2 and 3

Number	Reportable Subjects	Hours Total	Hours Theory	Hours Practical
S0301	Safety	16	11	5
S0302	Types and Terminology	8	4	4
S0303	Systems and Components	28	18	10
S0304	Wire rope and rigging	24	12	12
S0305	Lift Planning	52	38	14
S0306	Crane applications	84	20	64
S0307	Transporting a crane	16	5	11
S0308	Crane maintenance	12	4	8
	Total	**240**	**112**	**128**

Number:	S0301
Title:	**Safety**
Duration:	16 Total Hours
	Theory: 11 hours Practical: 5 hours
Prerequisites:	None
Co-requisites:	N/A

1.1 Regulations, manuals and policies
4 Total Hours Theory: 2 hours Practical: 2 hours

1.2 Safe working environment
5 Total Hours Theory: 3 hour Practical: 2 hours

1.3 Emergency safety procedures
2 Total Hours Theory: 2 hours Practical: 0 hours

1.4 Power line hazards
2 Total Hours Theory: 2 hour Practical: 0 hours

1.5 Worksite communications
3 Total Hours Theory: 2 hour Practical: 1 hours

Evaluation structure:
Knowledge is evaluated by theory testing and will account for approximately 15% of the overall mark. The application of safe working practices will be monitored throughout the in-school training and will be considered during practical evaluations.

Learning reference materials:
Occupational Health and Safety Act (OHSA)
Canadian Standards Association (CSA) Z150 and Z248
Workplace Hazardous Materials Information System (WHMIS)
Highway Traffic Act (HTA)
Construction Safety Association of Ontario (CSAO) publication
Manufacturers' manuals
Training Delivery Agent (TDA) training references and policies

Equipment requirements:
Personal protective clothing, equipment, fire extinguisher(s) and fighting equipment, two-way voice communication devices

1.1 - Regulations, manuals and policies

Cross Reference to Training Standards:

Branch 1	5318.4, 5318.6, 5319.1, 5321.1, 5223.1, 5327.1
Branch 2	5331.1, 5333.1, 5334.1, 5337.1

Duration: 4 Total Hours Theory: 2 hours Practical: 2 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to locate information related to crane operations from government regulations, manufacturers' manuals and the Training Delivery Agent references and policies.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

1.1.1 Describe the format and general content of books, manuals and sources of information related to crane operations including:

- Occupational Health and Safety Act (OHSA)
- Canadian Standards Association (CSA) Z150 and Z248
- Workplace Hazardous Materials Information System (WHMIS)
- Highway Traffic Act (HTA)
- Construction Safety Association of Ontario (CSAO) Publication
- Manufacturers' manuals including user and maintenance manuals
- Training Delivery Agent (TDA) training references and policies

1.1.2 Locate specific items of information in these documents related to crane operations.

1.2 - Safe working environment

Cross Reference to Training Standards:

Branch 1	5318.1, 5318.2, 5318.4, 5318.7
Branch 2	5330.1, 5330.2, 5330.5
Branch 3	5340.2, 5340.3, 5340.8

Duration: 5 Total Hours Theory: 3 hour Practical: 2 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to work safely at the work site in accordance with the Occupational Health and Safety Act and the Training Delivery Agent policy.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

1.2.1 Wear, maintain, and remove from service, personal protective clothing and equipment, including hard hat, boots, eyewear and hearing protection, as appropriate.

1.2.2 Use the 3-point contact method when mounting and dismounting cranes and other heavy equipment.

1.2.3 Describe unsafe workplace conditions, including hazards and obstructions.

1.2.4 State the procedures for notifying local utilities when operating near utility lines or potential hazards

1.2.5 Describe when barriers are required.

1.2.6 Explain the procedure for reporting accidents or incidents.

1.2.7 Complete a report to record an accident or incident.

1.2.8 Explain the procedure to determine whether a load is stuck or frozen to the surface.

1.2.9 State the operator's responsibilities in maintaining a safe work environment.

1.2.10 Describe changing work conditions that impact on crane operations (e.g., traffic, weather, location, operating blind).

1.2.11 Explain safety considerations when working in the proximity of other cranes and equipment

1.3 - Emergency procedures

Cross Reference to Training Standards:

Branch 1	5318.3, 5318.7
Branch 2	5330.3, 5330.6
Branch 3	5340.7, 5340.10

Duration: 2 Total Hours Theory: 2 hours Practical: 0 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to explain workplace and safety inspection requirements for compliance with the Occupational Health and Safety Act and the Training Delivery Agent policy.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

1.3.1 Describe recommended fire safety procedures.

1.3.2 Describe various pieces of fire fighting equipment normally found on a work site.

1.3.3 List the uses of standard fire fighting equipment.

1.3.4 State the requirements for fall protection training on the worksite.

1.3.5 State the requirements for WHMIS training on the worksite.

1.3.6 State the procedure for an emergency rescue from a crane (e.g., tower crane operator station, crane accident, fire).

1.4 - Power line hazards

Cross Reference to Training Standards:

Branch 1	5318.5, 5318.6, 5318.7
Branch 2	5330.7, 5336.13
Branch 3	5340.4, 5340.5

Duration: 2 Total Hours Theory: 2 hours Practical: 0 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to operate a crane around simulated high voltage equipment in accordance with Ontario Health and Safety Act, utility regulations, and other government legislation and the Training Delivery Agent policy.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

1.4.1 State procedures for operating in proximity of overhead conductors.

1.4.2 Interpret signage related to high voltage.

1.4.3 State safe limits of approach to overhead conductors.

1.4.4 Describe the procedures recommended in the event of contact with high voltage.

1.4.5 State the procedure for reporting contact with high voltage.

1.5 - Worksite communications

Cross Reference to Training Standards:

Branch 1	5318.8, 5321.7
Branch 2	5330.8, 5333.6
Branch 3	5340.13, 5342.3

Duration: 3 Total Hours Theory: 2 hours Practical: 1 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to communicate with the work site supervisor, colleagues and trade personnel using recommended signals or other communication devices in accordance with the Occupational Health and Safety Act and the Training Delivery Agent policy.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

1.5.1 Demonstrate standard hand signals used during crane operations.

1.5.2 Interpret standard crane hand signals.

1.5.3 Explain the requirements for a signaller.

1.5.4 Demonstrate the use of two-way electronic voice communication devices.

1.5.5 Explain the necessity of an operation communication plan.

1.5.6 Demonstrate effective oral communications (e.g., tact, diplomacy, assertiveness).

1.5.7 Demonstrate effective written communications (e.g., report writing, recording).

1.5.8 Interpret worksite audio signals (horn signals).

Number:	S0302
Title:	**Types and terminology**
Duration:	8 Total Hours
	Theory: 4 hours Practical: 4 hours
Prerequisites:	None
Co-requisites:	N/A

2.1 Types of cranes
2 Total Hours Theory: 1 hour Practical: 1 hour

2.2 Crane classifications
2 Total Hours Theory: 1 hour Practical: 1 hour

2.3 Hoisting terminology
4 Total Hours Theory: 2 hours Practical: 2 hours

Evaluation structure:
Knowledge is evaluated by theory testing and will account for 10% of the overall mark.

Learning reference materials:

Equipment requirements:

2.1 - Types of cranes

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0

Duration: 2 Total Hours Theory: 1 hour Practical: 1 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to identify common crane types.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

2.1.1 Identify various types of cranes including:

- boom trucks
- mobile cranes
- tower cranes
- self-erecting cranes

2.2 - Crane classifications

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0

Duration: 2 Total Hours Theory: 1 hour Practical: 1 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to categorize cranes using a variety of classifications.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

2.2.1 Categorize various types of cranes using the following classifications:

- carrier types (e.g., crawler, rubber, tower)
- hoist mechanisms (e.g., hydraulic, conventional, electrical)
- lifting capacity
- boom types (e.g., lattice, hydraulic, knuckle, luffing)
- heavy lift cranes (e.g., super lift, ringer)

2.3 - Crane terminology

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0, 5343.1

Duration: 4 Total Hours Theory: 2 hours Practical: 2 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to interpret hoisting crane terminology commonly used in the working environment.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

2.3.1 Define terms related to hoisting craning (e.g., wire rope, fittings, drums, hooks, sheaves, winch, slew, hoist).

Number:	S0303
Title:	**Systems and components**
Duration:	28 Total Hours
	Theory: 18 hours Practical: 10 hours
Prerequisites:	None
Co-requisites:	N/A

3.1 Carriers/ undercarriage components
3 Total Hours Theory: 2 hours Practical: 1 hour

3.2 Outriggers and stabilizers
1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

3.3 Turntable
1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

3.4 Power plants
2.5 Total Hours Theory: 2 hours Practical: 0.5 hour

3.5 Drive systems
1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

3.6 Pneumatic systems
1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

3.7 Hydraulic systems
1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

3.8 Electrical systems
1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

3.9 Steering systems
1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

3.10 Braking systems
1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

3.11 Hoisting systems
2.5 Total Hours Theory: 2 hours Practical: 0.5 hour

3.12 Attachments
3.5 Total Hours Theory: 2 hours Practical: 1.5 hours

3.13 Safety components, devices and aids
4.5 Total Hours Theory: 2 hours Practical: 2.5 hours

Evaluation structure:
Knowledge is evaluated by theory testing and will account for 15% of the overall mark.

Learning reference materials:

Equipment requirements:

3.1 - Carriers/undercarriage components

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0

Duration: 3 Total Hours Theory: 2 hours Practical: 1 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe the carrier/undercarriage components of a variety of common types of cranes.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.1.1 List carrier/undercarriage components (e.g., suspensions, carbody, wheels, tires, tracks and components).

3.1.2 Identify carrier/undercarriage components.

3.1.3 State the function of carrier/undercarriage components.

3.1.4 Recognize defects or malfunctions of the carrier/undercarriage.

3.2 - Outriggers and stabilizers

Cross Reference to Training Standards:

Branch 1	5319.0, 5324.5, 5324.6, 5324.7
Branch 2	5331.0, 5331.6
Branch 3	5341.0

Duration: 1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to identify and describe the function of outriggers and stabilizing equipment used on a variety of crane types.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.2.1 List the outrigger and stabilizing equipment.

3.2.2 Identify outrigger and stabilizing equipment.

3.2.3 State the function of outriggers and stabilizing equipment.

3.2.4 Recognize defects or malfunctions of outrigger and stabilizing equipment.

3.3 - Turntable

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0

Duration: 1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to identify and describe the function of the turntable and components on a variety of crane types.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.3.1 List the components of a turntable (e.g., swing circle, bearing, hook rollers).

3.3.2 Identify the components of the turntable.

3.3.3 State the function of turntable components.

3.3.4 Recognize defects or malfunctions of the turntable components (e.g., loose bolts, structural cracks, distortions and damage to the swing circle and turntable).

3.4 - Power plants

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0

Duration: 2.5 Total Hours Theory: 2 hours Practical: 0.5 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe the power plant systems on a variety of crane types.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.4.1 List the components of an electrical, diesel, and gas power plant system (e.g., block, piston, connecting rod, camshaft, rotors, stators).

3.4.2 Identify the components of the power plant systems.

3.4.3 State the function of the power plant components.

3.4.4 Recognize defects or malfunctions of the power plant system.

3.5 - Drive systems

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0

Duration: 1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe drive systems on a variety of crane types.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.5.1 List the components of the drive system (e.g., clutch, transmission, differentials, power take-offs, hydraulic motors).

3.5.2 Identify the components of the drive system.

3.5.3 State the function of the drive system components.

3.5.4 Recognize defects or malfunctions of the drive system.

3.6 - Pneumatic systems

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0

Duration: 1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe pneumatic systems used in crane operations.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.6.1 List the components of the pneumatic system (e.g., air brakes, air operating systems, horn, seats, boom locks, boom pawls).

3.6.2 Identify the components of the pneumatic system.

3.6.3 State the function of the pneumatic components.

3.6.4 Recognize defects or malfunctions of the pneumatic system.

3.7 - Hydraulic systems

Cross Reference to Training Standards:

Branch 1	5319.0, 55327.6
Branch 2	5331.0
Branch 3	5341.0

Duration: 1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe hydraulic systems used in crane operations.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.7.1 List the components of the hydraulic systems (e.g., hydraulic fluid, filters, lines, pumps, motors, fittings).

3.7.2 Identify the components of the hydraulic systems.

3.7.3 State the function of the hydraulic system components.

3.7.4 Recognize defects and malfunctions of the hydraulic system.

3.8 - Electrical systems

Cross Reference to Training Standards:

Branch 1	5319.0, 5327.7
Branch 2	5331.0
Branch 3	5341.0

Duration: 1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe electrical systems used on a variety of crane types.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.8.1 List the components of electrical systems (e.g., alternator, starter, regulator, wiring, fuses, generator).

3.8.2 Identify the components of the electrical system.

3.8.3 State the function of the electrical system components.

3.8.4 Recognize defects or malfunctions of the electrical system.

3.9 - Steering systems

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0

Duration: 1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe steering systems used on a variety of crane types.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.9.1 List the components of a steering system (e. g., axles, tie rods, steering box, sliding jaw clutch).

3.9.2 Identify the components of the steering system.

3.9.3 State the function of the steering system components.

3.9.4 Recognize defects or malfunctions of the steering system components.

3.10 - Braking systems

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0

Duration: 1.5 Total Hours Theory: 1 hour Practical: 0.5 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe travel braking systems used on a variety of crane types.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.10.1 List the components of the braking system (e.g., air compressor, brake chambers, drums, brake bands).

3.10.2 Identify the components of the braking system.

3.10.3 State the function of the braking system components.

3.10.4 Recognize defects or malfunctions of the braking systems.

3.11 - **Hoisting systems**

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0

Duration: 2.5 Total Hours Theory: 2 hours Practical: 0.5 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe hoisting systems used on a variety of crane types.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.11.1 List the components of the hoisting system (e.g., hydraulic boom, lattice boom, drums, hooks, sheaves, winch, upper brakes and clutches, trolley, rollers).

3.11.2 Identify the components of the hoisting system.

3.11.3 State the function of the hoisting system components.

3.11.4 Recognize defects or malfunctions of the components of a hoisting system.

3.12 - Attachments

Cross Reference to Training Standards:

Branch 3	5319.0, 5342.7
Branch 2	5331.0
Branch 3	5341.0

Duration: 3.5 Total Hours Theory: 2 hours Practical: 1.5 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe the components and function of a variety of attachments for cranes.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.12.1 List the a variety of attachments for cranes including:

- boom extensions
- boom stabilizers
- jibs,
- boom dolly
- elevated work platforms (e.g. personnel basket, etc.)
- heavy lift attachments
- dragline and bucket
- clam bucket
- drilling unit
- pile driving unit
- extraction unit

3.12.2 Identify the attachments.

3.12.3 State the function of each attachment.

3.12.4 Recognize defects or malfunctions of an attachment.

3.13 - Safety components, devices and aids

Cross Reference to Training Standards:

Branch 1	5318.9, 5319.0
Branch 2	5330.9, 5331.0, 5336.4
Branch 3	5340.6, 5341.0

Duration: 4.5 Total Hours Theory: 2 hours Practical: 2.5 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe various safety components, devices and aids for a variety of crane types.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

3.13.1 List the safety components, devices and aids for the a variety of crane types (e.g., safety guards, covers, Load-Moment-Indicator (LMI), anti-two block devices, boom length indicators).

3.13.2 Identify the safety components, devices and aids for the crane.

3.13.3 Identify on-board crane operator aids, including load charts, operators manual and log book, and ensure that they are applicable, legible and current for a given crane.

3.13.4 State the function of safety components, devices and aids for the crane.

3.13.5 Program the LMI, using appropriate crane configuration and lift data.

3.13.6 Recognize defects or malfunctions of safety devices, components and aids for the crane.

3.13.7 State the action to be taken when safety devices are not functioning.

Number:	S0304
Title:	**Wire rope and rigging**
Duration:	24 Total Hours
	Theory: 12 hours Practical: 12 hours
Prerequisites:	S0301, S0302, and S0303
Co-requisites:	N/A

4.1 Types of wire rope
2 Total Hours Theory: 1 hour Practical: 1 hour

4.2 Installation of wire rope
3 Total Hours Theory: 2 hours Practical: 1 hour

4.3 Inspection of wire rope
2 Total Hours Theory: 1 hour Practical: 1 hour

4.4 Rigging hardware
4 Total Hours Theory: 2 hours Practical: 2 hours

4.5 Inspection of rigging hardware
3 Total Hours Theory: 1 hour Practical: 2 hours

4.6 Rigging techniques
4 Total Hours Theory: 2 hours Practical: 2 hours

4.7 Maintenance of wire rope and rigging
4 Total Hours Theory: 2 hours Practical: 2 hours

4.8 Storage of wire rope and rigging
2 Total Hours Theory: 1 hour Practical: 1 hour

Evaluation structure:
Knowledge is evaluated by theory testing and will account for 15% of the overall mark. The application of safe working practices will be monitored throughout the training and considered during practical evaluations.

Learning reference materials:
Log book,
Occupational Health and Safety Act (OHSA)
Canadian Standards Association (CSA) Z150 Z248

Equipment requirements:
Examples of wire rope, rigging hardware, wire rope and drum, and lubricants

4.1 - Types of wire rope

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0

Duration: 2 Total Hours Theory: 1 hours Practical: 1 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe various types of wire rope used in crane operations.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

4.1.1 List various types of wire rope.

4.1.2 Identify various types of wire rope.

4.1.3 State the characteristics of each type of wire rope.

4.1.4 State the uses of each type of wire rope.

4.2 - Installation of wire rope

Cross Reference to Training Standards:

Branch 1	5319.0
Branch 2	5331.0
Branch 3	5341.0, 5341.6, 5341.7, 5347.2

Duration: 3 Total Hours Theory: 2 hours Practical: 1 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to ensure that the wire rope is installed in accordance with to manufacturers' recommendations and Occupational Health and Safety Act (OHSA).

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

4.2.1 Describe new cable wire rope installation procedure.

4.2.2 Identify rope guides, drums, blocks, hooks, sheaves, wedge and socket termination.

4.2.3 Interpret manufacturers' certificate of origin.

4.3 - Inspection of wire rope

Cross Reference to Training Standards:

Branch 1	5319.10, 5319.11
Branch 2	5331.11, 5331.12
Branch 3	5341.6, 5341.7, 5347.2

Duration: 2 Total Hours Theory: 1 hour Practical: 1 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to inspect wire rope, in accordance with manufacturers' recommendations and Occupational Health and Safety Act (OHSA).

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

4.3.1 Describe the inspection procedure for wire ropes.

4.3.2 Examine wire rope for defects (e.g., frayed wire rope, broken strands, lubrication, excessive wear, bird caging, kinking, flattening and proper spooling).

4.3.3 State the criteria to remove damaged or defective wire rope from service.

4.3.4 State the process to remove damaged or defective wire rope from service.

4.3.5 Examine drum for proper installation of the wire rope.

4.3.6 Record inspection and defects in log book.

4.3.7 Report defects and deficiencies to appropriate personnel.

4.4 - Rigging hardware

Cross Reference to Training Standards:

Branch 1	5323.1
Branch 2	5334.1
Branch 3	5343.4

Duration: 4 Total Hours Theory: 2 hours Practical: 2 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe rigging hardware used in crane operations.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

4.4.1 List the various rigging hardware, including:

- hooks
- shackles
- slings
- spreader bars
- equalizer beams
- chains
- bridles

4.4.2 Interpret specific information on rigging hardware from manufacturers' and rigging manuals.

4.4.3 Identify a variety of rigging hardware used in crane operations.

4.4.4 State the use of rigging hardware.

4.5 - Inspection of rigging hardware

Cross Reference to Training Standards:

Branch 1	5323.2
Branch 2	5334.2
Branch 3	5343.2, 5343.3

Duration: 3 Total Hours Theory: 1 hour Practical: 2 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to inspect rigging hardware, in accordance with manufacturers' recommendations and Occupational Health and Safety Act (OHSA).

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

4.5.1 Describe the inspection procedure for rigging hardware.

4.5.2 Examine rigging hardware for defects (e.g., excessive wear, damage, fraying, cracks, safety clips).

4.5.3 State the criteria for removing rigging hardware from service.

4.5.4 State the procedure for replacing various types of safety clips.

4.5.5 State the process for removing rigging hardware from service.

4.5.6 State when repair to rigging hardware is acceptable.

4.5.7 Report defects and deficiencies to appropriate personnel.

4.6 - Rigging techniques

Cross Reference to Training Standards:

Branch 1	5323.3,
Branch 2	5334.3
Branch 3	5343.5, 5343.6

Duration: 4 Total Hours Theory: 2 hours Practical: 2 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to assemble appropriate rigging for a given load, in accordance with manufacturers' recommendations.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

4.6.1 Select appropriate slings and hardware for a given load.

4.6.2 Establish safe and efficient rigging procedures for a given lift.

4.6.3 Select rigging in a safe and efficient manner for a given lift:

- advantages and disadvantages of particular hardware
- characteristics of the hardware
- characteristics of the load

4.7 - Maintenance of wire rope and rigging

Cross Reference to Training Standards:

Branch 1	5323.4,
Branch 2	5334.4, 5337.2
Branch 3	5341.6, 5343.6, 5347.2

Duration: 4 Total Hours Theory: 2 hours Practical: 2 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to perform routine maintenance of wire rope and rigging, in accordance with the manufacturers' recommendations.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

4.7.1 Describe how to perform routine maintenance on various types of wire ropes.

4.7.2 Describe how to perform routine maintenance on various types of rigging hardware.

4.7.3 State the criteria for lubricating wire rope.

4.7.4 Identify wire ropes requiring lubrication.

4.7.5 Lubricate wire rope using the appropriate application method.

4.7.6 Describe how to perform rigging hardware lubrication.

4.7.7 Describe procedures for cutting wire rope.

4.7.8 Record the routine maintenance in the log book.

4.8 - Storage of wire rope and rigging

Cross Reference to Training Standards:

Branch 1	5323.4
Branch 2	5334.4
Branch 3	5343.6

Duration: 2 Total Hours Theory: 1 hour Practical: 1 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to describe the criteria for storing store wire rope and rigging hardware, in accordance with manufacturers' recommendations.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

4.8.1 Describe the criteria for storing wire rope.

4.8.2 Describe the criteria for storing rigging hardware.

Number:	S0305
Title:	**Lift planning**
Duration:	52 Total Hours
	Theory: 12 hours Practical: 14 hours
Prerequisites:	S0301, S0302, and S0304
Co-requisites:	N/A

5.1 Site assessment
3 Total Hours Theory: 2 hours Practical: 1 hour

5.2 Determining load weights
15 Total Hours Theory: 12 hours Practical: 3 hours

5.3 Crane lifting capacity
3 Total Hours Theory: 2 hours Practical: 1 hour

5.4 Rigging requirements
10 Total Hours Theory: 8 hours Practical: 2 hours

5.5 Load/capacity charts
21 Total Hours Theory: 14 hours Practical: 7 hours

Evaluation structure:
Knowledge is evaluated by theory testing and will account for 15% of the overall mark. The application of safe working practices will be monitored throughout the training and considered during practical evaluations.

Learning reference materials:
Log book

Equipment requirements:
Examples of blue prints, engineered drawings, scientific calculators with metric conversions

5.1 - Common core

Cross Reference to Training Standards:

Branch 1	5321.2, 5322.1, 5324.1, 5324.4
Branch 2	5330.5, 5333.1, 5333.2, 5333.6, 5335.1, 5335.4, 5336.13
Branch 3	5340.9, 5343.2

Duration: 3 Total Hours Theory: 2 hours Practical: 1 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to inspect a job site to ensure a safe and efficient operation, in accordance with a pre-lift plan.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

5.1.1 State the elements of a standard lift plan.

5.1.2 State the purpose of site blue prints in preparing a lift plan.

5.1.3 State the purpose of an engineered drawing in preparing a lift plan.

5.1.4 Establish the location of the crane, giving consideration to:

- accessibility of site
- grade of the site
- soil conditions
- distance to embankments
- where the load is initially located
- where the load is to be placed
- proximity to other equipment
- overhead obstructions
- distance to electrical power lines
- known underground hazards
- weather conditions
- other potential hazards

5.1.5 Determine blocking/donnage to be used, according to soil conditions.

5.1.6 Determine the requirement for communications, signal persons, signallers, flag persons, barriers, grounding and bonding.

5.2 - Determining load weights

Cross Reference to Training Standards:

Branch 1	5321.4, 5325.2, 5326.2
Branch 2	5333.2, 5333.3, 5336.2
Branch 3	5342.4

Duration: 15 Total Hours Theory: 12 hours Practical: 3 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to calculate the combined weight of the crane's gross load for a given lift.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

5.2.1 Demonstrate the functions of a scientific calculator to perform mathematical calculations.

5.2.2 Perform fundamental mathematical functions:

- round off
- use fractions
- convert between metric and imperial units of measure
- determine circumference of a circle
- determine the perimeter of an object
- calculate the surface area of an object
- calculate the sine of an angle
- use the Pythagorean theorem to determine the length of the sides of right angle triangle

5.2.3 Calculate Load Weights by determining:

- the volume of an object
- the weight of an cubic unit of an object
- the bearing pressure on the load-supporting surface
- the weight of components
- the total weight of a load

5.2.4 Extract weight information from an engineer's drawing, blue print or bill of lading.

5.3 - Crane lifting capacity

Cross Reference to Training Standards:

Branch 1	5321.3, 5321.4, 5321.5, 5321.5, 5321.6, 5324.2, 5325.3, 5326.3
Branch 2	5333.4, 5333.5, 5336.3
Branch 3	5342.5, 5342.6, 5343.1

Duration: 3 Total Hours Theory: 2 hours Practical: 1 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to determine that the lifting capacity of the crane is sufficient when the required configuration and attachments are considered.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

5.3.1 Explain the fundamentals of leverage as they apply to crane operations.

5.3.2 Establish optimum boom configurations (e.g., boom length, boom angle, radius, hook height).

5.3.3 Select a configuration appropriate for lifting the load by taking into consideration radius, parts of line, height and the combined weight of the load and rigging for a given crane.

5.3.4 Verify that, for a given crane, the configuration is appropriate for the lift.

5.3.5 Differentiate between gross load and gross capacity.

5.4 - Rigging requirements

Cross Reference to Training Standards:

Branch 1	5321.5
Branch 2	5334.1

Duration: 10 Total Hours Theory: 8 hours Practical: 2 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to select rigging hardware to safely lift a given load in accordance with manufacturers' recommendations and Occupational Health and Safety Act (OHSA).

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

5.4.1 Determine load configuration.

5.4.2 Verify height, width, length and weight of the load.

5.4.3 Calculate the centre of gravity of the load.

5.4.4 Verify any special lift instructions.

5.4.5 Calculate the safe working load (SWL) for wire rope and rigging hardware.

5.4.6 State the criteria to select the appropriate hardware.

5.4.7 State the criteria to select the appropriate safety devices.

5.4.8 Calculate the load on slings of equal and unequal lengths.

5.5 - Load/capacity charts

Cross Reference to Training Standards:

Branch 1	5321.5
Branch 2	5334.1

Duration: 21 Total Hours Theory: 14 hours Practical: 7 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to use a basic load/capacity chart to determine the gross capacity for basic applications.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

5.5.1 State the elements of a basic load/capacity chart, including:

- boom length
- boom angle
- attachments
- radius
- quadrant
- weight of the intended load
- weight of the rigging

5.5.2 Locate the specific information from a basic load/capacity chart.

5.5.3 Determine, given the crane load/capacity technical data and lift information, whether the lift can be done within manufacturers' specifications.

Number:	S0306
Title:	**Crane applications**
Duration:	84 Total Hours
	Theory: 20 hours Practical: 64 hours
Prerequisites:	S0301, S0302, S0303, S0304, and S0305
Co-requisites:	N/A

6.1 Interpret operating manuals

2 Total Hours Theory: 1 hour Practical: 1 hour

6.2 Pre-operational inspections

10 Total Hours Theory: 4 hours Practical: 6 hours

6.3 Pre-operational setup

8 Total Hours Theory: 2 hours Practical: 6 hours

6.4 Hoisting techniques

40 Total Hours Theory: 8 hours Practical: 32 hours

6.5 Operate 8-15 ton mobile crane (boom truck)

19 Total Hours Theory: 3 hours Practical: 16 hours

6.6 Leave crane unattended

5 Total Hours Theory: 2 hours Practical: 3 hours

Evaluation structure:
Knowledge is evaluated by theory testing and will account for 10% of the overall mark. The application of safe working practices will be monitored throughout the training and considered during practical evaluations.

Learning reference materials:
Manufacturers' manuals
Occupational Health and Safety Act (OHSA)
Training Delivery Agent (TDA) policies

Equipment requirements:
An 8-15 ton mobile crane (boom truck)

6.1 - Interpret operator manuals

Cross Reference to Training Standards:

Branch 1	5319.1
Branch 2	5331.1
Branch 3	5341.1, 5344.1, 5345.1, 5346.1, 5347.1

Duration: 2 Total Hours Theory: 1 hour Practical: 1 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to apply inspection, setup and operating information from the manufacturers' operator manuals

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

6.1.1 Locate specific information in a manufacturers' manual related to the inspection, setup and operation for a given crane.

6.1.2 Interpret specific information in a manufacturers' manual related to the inspection, setup and operation for a given crane.

6.2 - Pre-operational inspections

Cross Reference to Training Standards:

Branch 1	5319.2, 5319.3, 5319.4, 5319.5, 5319.6, 5319.7, 5319.8, 5319.9, 5319.12, 5319.13, 5319.14, 5319.16, 5319.17, 5319.18, 5319.19, 5319.20, 5319.21
Branch 2	5330.4, 5331.2, 5331.3, 5331.4, 5331.5, 5331.6, 5331.7, 5331.8, 5331.9, 5331.10, 5331.13, 5331.14, 5335.3, 5335.5, 5335.6, 5335.7, 5336.1
Branch 3	5341.2, 5341.3, 5341.4, 5341.5, 5341.8, 5341.9, 5341.10, 5341.11, 5344.3, 5344.5, 5344.6, 5344.7, 5344.8, 5344.9, 5344.10, 5344.11, 5344.12, 5345.2, 5345.3, 5346.7, 5346.8, 5347.5

Duration: 10 Total Hours Theory: 4 hours Practical: 6 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to safely and efficiently perform a pre-operational inspection, in accordance with manufacturers' recommendations, Occupational Health and Safety Act (OHSA), and Training Delivery Agent (TDA).

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

6.2.1 State sequence of inspection procedures recommended for a given crane.

6.2.2 Verify that all the operator aids for the crane are in place.

6.2.3 Confirm that all pertinent inspection, erection reports are completed and filed, according to OHSA and TDA.

6.2.4 Confirm that all safety and emergency devices are in place and operational.

6.2.5 Locate all controls and system gauges.

6.2.6 Perform a pre-operation inspection for a given crane, according to manufacturers' procedures.

6.2.7 Perform a function test on the hoist system.

6.2.8 Perform basic repairs and maintenance.

6.2.9 Report any defects or deficiencies to the supervisor.

6.2.10 Record any defects or deficiencies in the crane log book.

6.2.11 Record all repairs or maintenance in the appropriate crane log book.

6.3 - Pre-operational setup

Cross Reference to Training Standards:

Branch 1	5324.3, 5324.5, 5324.6, 5324.7, 5324.8, 5324.9, 5325.1
Branch 2	5335.1, 5335.3
Branch 3	5344.2, 5345.2

Duration: 8 Total Hours Theory: 2 hours Practical: 6 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to setup a given crane, in accordance with the manufacturers' recommendations.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

6.3.1 State the setup procedure for a given crane.

6.3.2 Identify overhead obstructions and underground hazards in the lift area.

6.3.3 Ensure that the blocking/donnage is sufficient, considering load requirements and surface conditions.

6.3.4 Program or adjust safety devices, according to manufacturers' recommendations.

6.4 - Hoisting techniques

Cross Reference to Training Standards:

Branch 1	5319.15, 5325.4, 5325.5, 5325.6, 5325.7, 5325.8, 5325.10, 5326.4, 5326.5, 5326.6, 5326.7, 5326.11
Branch 2	5335.2, 5336.5, 5336.6, 5336.7, 5336.8, 5336.9
Branch 3	5344.4, 5344.13, 5345.4, 5345.5, 5345.6, 5345.7, 5345.8, 5345.9, 5345.10, 5345.11, 5345.12, 5345.13, 5345.14, 5345.15, 5345.16, 5345.17

Duration: 40 Total Hours Theory: 8 hours Practical: 32 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to perform hoisting operations in a safe and efficient manner, in accordance with the manufacturers' recommendations.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

6.4.1 Operate a given crane with and without a load by:

- booming up/down
- telescoping or trolleying in/out
- slewing clockwise and counter clockwise
- hoisting up and down

6.4.2 Adjust procedures, according to weather conditions.

6.4.3 Maintain control of the hook block in a safe manner through all functions.

6.4.4 Describe pick and carry procedure.

6.4.5 Perform pick and carry lift with a given crane.

6.4.6 Describe the procedure for operating in the vicinity of high voltage equipment.

6.4.7 Perform a lift in proximity to simulated high voltage equipment.

6.4.8 Describe the procedures for doing a blind lift.

6.4.9 Perform a simple blind lift.

6.5 - Operate 8-15 ton mobile crane (boom truck)

Cross Reference to Training Standards:

Branch 2	5335.2, 5336.12, 5336.13
Branch 3	5346.4

Duration: 19 Total Hours Theory: 3 hours Practical: 16 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to lift a given load using an 8-15 ton mobile crane (boom truck), in accordance with manufacturers' recommendations.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

6.5.1 Assess the lift site.

6.5.2 Plan the lift.

6.5.3 Perform a pre-operational inspection of the mobile crane (boom truck).

6.5.4 Setup the crane.

6.5.5 Rig the load.

6.5.6 Hoist the load.

6.5.7 Monitor equipment performance.

6.5.8 Troubleshoot equipment problems.

6.5.9 Move the load to the intended destination.

6.5.10 Perform a post-operational procedure.

6.6 - Leave crane unattended

Cross Reference to Training Standards:

Branch 2	5318.10, 5318.11
Branch 3	5340.11, 5340.12

Duration: 5 Total Hours Theory: 2 hours Practical: 3 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to prepare a crane to be left unattended for short or long periods of time, in accordance with manufacturers' recommendations.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

6.6.1 State the procedure for leaving a crane unattended for short periods of time (e.g., lunch breaks).

6.6.2 State the procedure for leaving a crane unattended for long periods of time (e.g., overnight, weekends).

6.6.3 Perform shutdown procedure:

- clean wheels/tracks and attachments
- park equipment in appropriate location
- shut down and secure equipment
- perform housekeeping tasks
- conduct post-operational inspection

Number:	S0307
Title:	**Transporting a crane**
Duration:	16 Total Hours
	Theory: 5 hours Practical: 11 hours
Prerequisites:	S0301, S0302, and S0303
Co-requisites:	N/A

7.1 Highway Traffic Act (HTA)
1 Total Hour Theory: 1 hour Practical: 0 hours

7.2 Preparing a crane for travel
4 Total Hours Theory: 1 hour Practical: 3 hours

7.3 Preparing a crane for transport
4 Total Hours Theory: 1 hour Practical: 3 hours

7.4 Assembly and disassembly
7 Total Hours Theory: 2 hours Practical: 5 hours

Evaluation structure:

Knowledge is evaluated by theory testing and will account for 10% of the overall mark. The application of safe working practices will be monitored throughout the training and considered during practical evaluations.

Learning reference materials:
Manufacturers' manuals
Ontario Highway Traffic Act

Equipment requirements:
Crane, crane components and transporter

7.1 - Highway Traffic Act

Cross Reference to Training Standards:

Branch 1 5320.3, 5325.12, 5326.12

Duration: 1 Total Hour Theory: 1 hour Practical: 0 hour

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to state the criteria for the travel or transport of a crane on public highways, in accordance with the Ontario Highway Traffic Act.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

7.1.1 Locate related sections of the Highway Traffic Act.

7.1.2 Interpret related sections of the Highway Traffic Act.

7.1.3 State the criteria that would warrant special permits for travel or transport of a crane on public highways.

7.2 - Preparing a crane for travel

Cross Reference to Training Standards:

Branch 1	5320.1, 5320.2, 5320.3, 5320.4, 5326.8
Branch 2	5336.14

Duration: 4 Total Hours Theory: 1 hour Practical: 3 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to prepare a truck rubber-tired crane for highway travel, in accordance with manufacturers' recommendations and the Ontario Highway Traffic Act.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

7.2.1 Determine the procedure for preparing a given truck rubber-tired crane for travel.

7.2.2 Secure the components and/or load on a given truck rubber-tired crane to prevent shifting during travel.

7.2.3 Verify that all permits are in order for travel on a public highway.

7.3 - Preparing a crane for transport

Cross Reference to Training Standards:

Branch 1	5320.5, 5320.6
Branch 2	5332.1, 5332.2, 5332.3, 5332.4, 5332.5, 5332.6

Duration: 4 Total Hours Theory: 1 hours Practical: 3 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to prepare a crane for highway travel on a transporter, in accordance with manufacturers' recommendations and the Ontario Highway Traffic Act.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

7.3.1 Describe the requirements of a transporter to transport a crane on public highways.

7.3.2 Ensure the transporter has the structural integrity and capacity to transport the crane and components.

7.3.3 Describe the procedure for preparing a crane for transporter travel.

7.3.4 Load and secure the crane and components on a transporter, following manufacturer procedures and the Highway Traffic Act.

7.3.5 Ensure that all flags, flashers and warning signs are in place and serviceable.

7.3.6 Verify that all permits are in order for the crane and transporter.

7.3.7 Unload the crane and components from the transporter.

7.4 - Assembly and disassembly

Cross Reference to Training Standards:

Branch 1	5320.3, 5322.1, 5322.2, 5322.3, 5322.4, 5322.5, 5322.6 5322.7, 5322.8, 5322.9
Branch 2	5336.15, 5336.16, 5346.3

Duration: 7 Total Hours Theory: 2 hours Practical: 5 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to assemble and disassemble a crane, in accordance with the manufacturers' recommendations.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

7.4.1 Describe assembly/disassembly procedures as recommended by the manufacturer, including:

- installation/removal of attachments
- counter weights
- booms
- adjust undercarriage (where applicable)
- attach boom dolly, if required

7.4.2 Ensure area to be used for assembly or disassembly is secure and free of obstructions.

7.4.3 Position crane, in accordance with site assembly/disassembly plan.

Number:	S0308
Title:	**Crane maintenance**
Duration:	12 Total Hours
	Theory: 4 hours Practical: 8 hours
Prerequisites:	S0301, S0302, and S0303
Co-requisites:	N/A

8.1 Tools for basic crane maintenance

4 Total Hours Theory: 2 hours Practical: 2 hours

8.2 Basic crane maintenance

8 Total Hours Theory: 2 hours Practical: 6 hours

Evaluation structure:
Knowledge is evaluated by theory testing and will account for 10% of the overall mark. The application of safe working practices will be monitored throughout the training and considered during practical evaluations.

Learning reference materials:
Manufacturers' manuals
Occupational Health and Safety Act (OHSA)
Crane Log Book

Equipment requirements:
A crane, all fluids, lubricants and a variety of tools

8.1 - Tools for basic crane maintenance

Cross Reference to Training Standards:

Branch 1	5319.19, 5327.1, 5327.2, 5327.3, 5327.4, 5327.5, 5327.6, 535327.7, 5327.8
Branch 3	5347.1, 5347.3, 5347.4

Duration: 4 Total Hours Theory: 2 hours Practical: 2 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to select appropriate tools to perform basic maintenance on a crane, in accordance with manufacturers' recommendations and Occupational Health and Safety Act (OHSA).

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

8.1.1 List the tools required to perform basic maintenance (e.g., grease gun, adjustable wrenches, mallets, screwdrivers, hammers, vice grips, shovels, pry bars, ladders, measuring devices).

8.1.2 Identify the tools required to perform basic maintenance.

8.1.3 State the function of the tools required for basic maintenance.

8.1.4 Select the appropriate tools for an application.

8.2 - Basic crane maintenance

Cross Reference to Training Standards:

Branch 1	5319.19, 5327.1, 5327.2, 5327.3, 5327.4, 5327.5, 5327.6 5327.7, 5327.8
Branch 2	5337.1, 5337.2, 5337.3, 5337.4, 5337.5, 5337.6, 5337.7, 5337.8
Branch 3	5347.1, 5347.3, 5347.4, 5347.6

Duration: 8 Total Hours Theory: 2 hours Practical: 6 hours

GENERAL LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to perform basic maintenance on a crane, in accordance with manufacturers' recommendations and Occupational Health and Safety Act (OHSA).

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

8.2.1 Interpret maintenance information from manufacturers' manuals.

8.2.2 Determine the maintenance schedule.

8.2.3 Select the correct fluids and lubricants.

8.2.4 Grease fittings and open gears.

8.2.5 Add fluids.

8.2.6 Adjust or replace belts.

8.2.7 Adjust tire pressure.

8.2.8 Adjust control mechanisms (e.g., slack adjusters, rollers, cables, brakes, clutches).

8.2.9 Perform structural maintenance (e.g., bolts, wedges, cotter keys, cotter pins, guard rails).

8.2.10 Clean crane components (e.g., batteries, cab, windows, wheels, track).

8.2.11 Service gearbox and hydraulic tank breathers.

8.2.12 Perform outrigger and stabilizer maintenance.

8.2.13 Perform boom maintenance.

8.2.14 Perform steering system maintenance.

8.2.15 Drain air tanks.

8.2.16 List factors that influence the operator's maintenance responsibilities (e.g., legalities, location, capabilities, tool availability, availability of advanced level maintenance).

8.2.17 Repair or replace defective components.

8.2.18 Report defects and deficiencies to supervisor.

8.2.19 Record maintenance performed and requested in the log book.